

# Biology Major— Ecology Option 2020-21

The Ecology option is designed to give students a strong background in ecological methods and theory. It is an excellent way to prepare for graduate programs in ecology, as well as a variety of other ecological and conservation careers. Courses used to satisfy the Ecology option also count for the Biology and Society, Writing Intensive, Organismal Biology, Physiology and Experiential Learning or Integrative Biology Elective requirements for the Biology major. Ecology option students should seriously consider completing ST 351, 411 and 412 (instead of ST 351, 352) for the major. Up to three credits of approved BI 401 Research, BI 406 Curatorial Assistant or 410 Internship credit may be used as electives in the option. Other coursework taken abroad or at Hatfield may be approved by the IB lead advisor. **Previous versions of this option are different and are tracked in MyDegrees. All courses and prerequisites are subject to change, and the listing of term is based on projected Corvallis campus offerings.**

## Plant Organismal Biology (select one course from the following)

Course	Pre(Co)requisites	Term	Credits
BOT 321 Plant Systematics	BI 221, 222, 223 (C-)	SP	4
BOT 416 Aquatic Botany	BI 221, 222, 223 (C-)	F	4
RNG 353 Wildland Plant Identification	BI 221, 222, 223 (C-)	F, SP	4

## Animal Organismal Biology (select one course from the following)

Z 361 Invertebrate Biology <b>AND</b> Z 362: Invertebrate Biology Lab	BI 221, 222, 223 (C-)	SP	(3+2)
Z 371 Vertebrate Biology <b>AND</b> Z 372: Vertebrate Biology Lab	BI 221, 222, 223 (C-)	F	(3+2)
Z 477 Aquatic Entomology	BI 221, 222, 223 (C-)	W	4

## Methods and Writing Intensive (WIC) Course (select ONE)

BI 371 Ecological Methods	BI 370	SP	3
BI 373 Methods in Marine Ecology	BI 351 or BI 370, ST 351 (ST 352 Recommended)	SP	3

## Behavior and Physiological Ecology

Z 350 Animal Behavior <b>AND</b>	BI 221, 222, 223 (C-)	W	3
Z 423 Environmental Physiology <b>OR</b>		F	3
BOT 488 Environmental Physiology of Plants		W	3

## Population Ecology (select one course from the following)

BI 483 Population Biology	MTH 251, ST 351, ST 352, (BI 370 or BI 311)	W	3
BOT 442 Plant Population Ecology	BI 370 or BOT 341	F	3
FW 320 Introduction to Population Dynamics	MTH 251 or MTH 227 and ST 351	W	4

## Community and Ecosystem Ecology (select one course from the following)

BI 306 Environmental Ecology	BI 221, 222, 223 (C-)	?	3
BI 351 Marine Ecology	BI 221, 222, 223 (C-)	W	3
BI 353 Pacific Northwest Coastal Ecosystems	BI 221, 222, 223 (C-); taught at Hatfield	SU	3
BI 481 Biogeography	BI 370	Alternate W	3
FES 341 Forest Ecology	BI 221, 222, 223 (C-)	F, W	3
FW 321 Applied Community and Ecosystem Ecology	FW 320	SP	3
FW 456 Freshwater Ecology and Conservation (5)	Senior Standing	SP	5
FW 479 Wetlands and Riparian Ecology	BI 370	Online only	3
GEO 484 Introduction to Biogeochemistry	MTH 111; CH 232/262	W	3
OC/FW 434 Estuarine Ecology	OC 201	F	4

## Conservation and Human Impacts (select one course from the following)

BI 301 Human Impacts on Ecosystems	No 1st year; BI 221, 222, 223 or CH 233/263	W	3
BI 348 Human Ecology	No 1st year	F online	3
Z 349 Biodiversity: Causes, Consequences, and Conservation	No 1st year	F, W	3

## Environmental Policy (select one course from the following)

AEC 250 Introduction to Environmental Economics and Policy	MTH 111 or equivalent	W	3
AEC 253 Environmental Law, Policy, and Economics		W	4
AEC 351 Natural Resource Economics and Policy	AREC 250 or ECON 201; MTH 111	F	3
AEC/ECON 352 Environmental Economics and Policy	AREC 250 or ECON 201	SP	3
FES/TOX 435 Genes and Chemicals in Agriculture: Value and Risk	BI 221, 222, 223; CH 233/263	SP	3
FES 485 Consensus and Natural Resources		F, W	3
FW 350 Endangered Species, Society and Sustainability	FW 251	F	3

<b>Electives List (select one course from track II and 3 experiential learning credits from Track I or two courses from Track II)</b>			
<b>Track I: Experiential Learning Credits (complete any combination of three credits if taking only one course below)</b>			
BI 401 Research and Scholarship	Departmental Approval	All Terms	1-3
BI 406 Projects: Curatorial Assistant	Departmental Approval	All Terms	1-3
BI 410 Internship	Departmental Approval	All Terms	1-3
<b>Track II Ecology Elective Course</b>			
BI 353 Pacific Northwest Coastal Ecosys. (if not taken above)	BI 221, 222, 223 (C-), taught at Hatfield	SU	3
BI 358 Symbiosis and the Environment	BI 221, 222, 223 (C-) and CH 123 or CH 233/263	Alternate W	3
BI 375 Field Methods in Ecological Restoration	BI 221, 222, 223 (C-), taught at Cascades	SU?	5
BI 427 Paleobiology	BI 221, 222, 223 (C-)	SP	3
BI 481 Biogeography (if not taken above)	instructor approval required	Alternate W	3
BI 485 Monster Biology	BI 370 and BI 311 (may be taken concurrently)	W	3
BI 495 Disease Ecology	BI 370	Alternate W	3
BOT 341 Plant Ecology	BI 221, 222, and 223 or BOT 321	SP	4
BOT 458 Ecosystem Genomics	BI 311 and BB 314	SP	3
CH 390 Environmental Chemistry	CH 331	W, SP	3
FES 440 Wildland Fire Ecology	BI 370, junior standing	W	3
FES/FW 452 Biodiversity Conservation in Managed Forests <b>OR</b> FW 458 Mammal Conservation <b>OR</b> HORT 318 Applied Ecology of Managed Ecosystems	BI 370	SP SP W	3 4 3
FES/FW 445 Ecological Restoration	BI 370	SP	4
FW 421 Aquatic Biological Invasions	BI 221, 222, 223, taught at Hatfield	W?	4
FW 462 Ecosystems Services	BI 370; Ecampus only	Ecampus only	3
MB 448 Microbial Ecology	MB 302	W	3
ST 435 Quantitative Ecology	ST 412/512	?	3

## Ecology Careers

Ecology is the study of the physical and biological factors that affect the distribution and abundance of organisms, and ecological knowledge is foundational to fields such as conservation biology, environmental sciences and others. Most ecologists address questions on a wide variety of spatial and temporal scales over their career, and individuals most often work on a variety of organisms. Broad training is considered advantageous. Completion of the Biology major and the coursework in the Ecology option provides a solid foundation for a career in ecology and other biological fields. Entry-level technician positions in ecology are found in settings such as agencies, non-governmental organizations, environmental consulting companies and academia. Graduate work in ecology can be an important consideration as it increases both salary and leadership opportunities. All students interested in ecology should plan on professional experience before graduation. Further information about ecology careers can be found at:

<https://www.esa.org/esa/careers-and-certification/>  
<http://www.conservationjobboard.com/Category/ecology-jobs>

### Ecological Skills and Tools

Most ecologists have a significant component of field work in their positions, though it is rarely year-round. Many jobs will require some outdoor experience. The OSU Adventure Leadership Institute offers programming and a certificate related to leadership development and practical skills such as orienteering, wilderness first aid and others. See <http://recsports.oregonstate.edu/ali/what-is-ali>.

Statistical knowledge can be particularly important in ecology. It is recommended that Ecology option students complete the ST 351, 411 and 412 series instead of ST 351 and 352.

Global Information Systems (GIS) is a useful tool for ecologists, particularly those interested in landscape ecology. OSU offers a 27-credit GIScience certificate <http://ceas.oregonstate.edu/giscience/>.

Chemistry knowledge is desirable in ecology, particularly ecosystem ecology. Completion of the chemistry minor requires one additional course, typically CH 390 Environmental Chemistry.

### Professional Experience

- Students interested in research should look up faculty research on unit websites and contact them directly about volunteering - most student positions are unpaid. More information and a list of units with ecology faculty at <http://ib.oregonstate.edu/professional/research-internships>.
- For off-campus opportunities, see the ecology list at <http://ib.oregonstate.edu/professional/internship-research/intern-volunteer-list>.
- The NSF REU (Research Experiences for Undergraduates) program is an excellent and nationally competitive program with many ecology sites. <http://www.nsf.gov/home/crssprgm/reu/>

### International Opportunities

Many international programs in ecology are available. Study abroad and internships can be integrated in to a four-year degree with the Ecology option and include diverse group choices. See <http://ib.oregonstate.edu/ugfiles/studyabroad.pdf>.